BUTCHER

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LIGATURE OF THE ILIAC ARTERY

FOR THE

CURE OF INGUINAL ANEURISM;

AND ON

EXCISION OF THE KNEE-JOINT.

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BY

RICHARD G. BUTCHER, M.R.I.A.;

M.D. (HONORIS CAUSA) OF THE UNIVERSITY OF DUBLIN;
UNIVERSITY LECTURER ON OPERATIVE SURGERY, AND SURGEON TO SIR P. DUN'S HOSPITAL;
EXAMINER ON OPERATIVE AND PRACTICAL SURGERY IN THE
UNIVERSITY OF DUBLIN;
LATE SENIOR SURGEON TO MERCER'S HOSPITAL, AND LECTURER ON OLINICAL SURGERY;
HONORARY M.D. OF THE COLLEGE OF PHYSICIANS OF PHILADELPHIA;
EX-PRESIDENT OF THE ROYAL COLLEGE OF SURGEONS OF IRELAND;
FELLOW AND LICENTIATE OF THAT BODY,
AND FOR MANY YEARS PRESIDENT OF ITS SURGIOAL COURT OF EXAMINERS;
LIKEWISE EXAMINER ON ANATOMY AND PHYSIOLOGY IN THE COLLEGE FOR MANY YEARS;
MEMBER OF THE ROYAL COLLEGE OF SURGEONS OF ENGLAND;
CORRESPONDING MEMBER OF THE SURGICAL SOCIETY OF LIEGE;
ETC., ETC., ETC.

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ON

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CURE OF INGUINAL ANEURISM;

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In the present communication I wish to draw the attention of the profession to two very important surgical operations. The first, ligature of the iliac artery for the cure of inguinal aneurism; the second, that of excision of the knee-joint. In the first operation an illustration is afforded of the successful application of the cord, its healthy separation, the healing of the wound, and the cure of the aneurism. However, by the injudicious conduct of the patient, a most serious complication was set up: inflammation of the sac of the aneurism, diffuse inflammation of the thigh, accompanied by the most alarming constitutional disturbance, and yet the patient was saved by operative surgery. In connexion with this part of the paper, I have figured the enormous size of the inguinal aneurism previous to operation, and beneath it the limb after being cured, showing the line of cicatrix where the iliac artery had been ligatured; while the frontispiece to these pages gives an accurate and beautiful picture of the old man cured; the cicatrix where the artery was tied, and that, after the extensive wound in the thigh, required for the extrusion of the diseased and suppurating sac and its contents, as well as for the relaxation of the tensive inflammation of the limb. In the second operation, I have recorded another

successful case of excision of the knee-joint. I have given illustrations of the portions of the diseased bones removed, separately and together; and also the bones united by osseous union, and in the direct axis of the limb. I have confirmed this fact by another remarkable example, which I have figured, as well as the portions of the carious bones cut out in the case. I have likewise given the picture of a man after being cured, who I operated on twenty years ago, and likewise a truthful representation from a photograph of his condition now—showing how well the limb has stood the test of rough usage and trial through so many years; the diseased bones cut out in this case have been accurately copied, and represented both separately and placed in apposition.

I.—*Enormous Inguinal Aneurism treated successfully by Ligature of the Iliac Artery, and the most serious Complications cured by Operative Surgery.*

Edward Neil, aged seventy-six years, admitted to Sir P. Dun's Hospital, January 8th, 1872, with an enormous aneurism filling up the entire inguinal region in the right thigh and extending above Poupart's ligament. The patient stated that he was a quarryman by occupation, that he laboured hard all his life, but was never confined a day to bed by sickness. Twelve months before the above date, when unloading some stones from a cart, one fell forcibly upon him, bruising the middle of the right thigh; for more than a fortnight the pain was very severe, and at first so troublesome that he had to give up work for several days. After the acute pain had passed away there remained in the stricken part a dull heavy weight for more than two months; but not severe enough to prevent his following, at the latter part of this time, his usual occupation. At the end of the third month after the accident, he perceived a small beating tumour at the groin, but could not distinctly affirm that this part was not also injured when the stone fell upon him; indeed he lent to the belief that it must have been, the stone was so large a size. Gradually and steadily the tumour began to enlarge, and with persistent pain on the inner side of the thigh; the pain was never very severe at the groin, but the violent beating and throbbing of the part kept his thoughts constantly fixed upon it. During the long period of nine months, from the first week of which the patient noticed the "jumping" of the tumour, when only the size of a

"wall-nut" until the date he applied to me, when the tumour assumed the size of a large melon, he daily exerted himself in bodily labour, and constantly carrying very heavy weights.

On the 6th of January, 1872, the patient consulted me at Sir P. Dun's Hospital; having heard the foregoing history, I made a very careful examination of the case. The man walked half-doubled with a very crippled gait into the consulting room, and at once attracted my immediate observation. On stripping him I perceived a large pulsating tumour in the right groin, in transverse measurement eight inches, filling up the entire inguinal region; in its vertical axis nine inches; raised above the surface in its most prominent part three inches; its lower edge was fusiform in the line of the femoral artery for two inches, while its upper border was curved convex upwards for an inch above Poupart's ligament. The circumference of the limb at the most prominent part of the tumour measured nineteen inches, while that of the sound thigh at a corresponding point was only fourteen inches. The integument over the tumour, its covering, was unaltered in colour, with the exception that some veins of magnitude coursed over the surface but were not channelled, simply superficial—some solid laminæ bounded the walls of the tumour, but by gentle, steady and equable pressure the swelling could be reduced more than two-thirds of its bulk—the pressure being taken away, the integument was rapidly lifted up again and the tumour regained its former size. On examination with the stethoscope, there was a loud bruit at the point of entrance of the artery into the dilatation, and also at its point of exit below, while there was only a diffused murmur within the tumour, and a loud thump given to the instrument from the column of blood thrown in. The leg was not swollen, yet there was slight œdema at either side of the tendo Achilles. A most searching examination was made as to the condition of the arterial system. The heart seemed healthy in its force and beat, and its second sound clear and normal. On the most careful stethoscopic application no roughness or ruffling could be detected in the thoracic arch—the pulse beat 78 in the minute, regular and with good volume. Now, as to a comparison of the circulation in the sound and affected limb; the circulation in the posterior tibial and anterior tibial arteries of the affected limb was feeble, and as contrasted with these vessels in the sound one, somewhat deficient in force. The venous circulation was somewhat tardy in the affected

limb, while in the sound one it was not changed from a healthy state; while the temperature of each remained the same. After considering the different points in reference to the management of this serious and most interesting case, I came to the conclusion that it was best to perform such an operation as would enable me to tie the external iliac artery high up near its origin, or, if necessary, the common iliac itself. The tumour, as I have before stated, extended so far above Poupart's ligament, that Cooper's operation was not at all applicable. Neither was it a case where pressure could be tried, it could not be brought to bear upon the upper part of the iliac artery; neither would any amount of pressure that could be made or borne on the abdominal aorta lessen the heave of the fluid contents of this large tumour. I may state now, that I was compelled to have recourse to the operation previous to the time I had intended, owing to the sudden and rapid enlargement and tension of the aneurism; I feared the sac might give way suddenly, and so probably render all attempts at saving life abortive. The patient was admitted to hospital on the evening of the 8th of January; on the 9th I had his small and large intestines well cleared out of all accumulated matter; early on the morning of the 10th of January an oil enema was administered, and all lodgments in the rectum cleared away, and at 10 o'clock the patient was brought into the operating theatre, placed under the influence of chloroform, and I proceeded to tie the iliac artery high up, after the following manner.—A word with regard to settling the patient on the operating table; the body was placed horizontal, the limbs extended, and the head comfortably supported; I believe this position better than the body somewhat raised and the limb on the affected side slightly flexed. I insist upon this former position, as affording greater facilities in the earlier steps of the operation, owing to the parts about to be divided being put upon the stretch. Standing on the right side of the patient, the first incision was commenced unusually high in this case (owing to the encroachment upwards of the tumour), fully two inches and a half above the spine of the ilium, and about an inch and three-quarters internal to this point, from the point where the knife was first laid on, it was carried with a slight inclination outwards and downwards to about an inch above Poupart's ligament. By this sweep of the knife the skin, superficial fascia, and fat were all cut through, and the apneurosis of the external oblique muscle exposed; a small incision through it at

the lowest part of the wound allowed a director to be passed upwards beneath it, when the strained tendinous structure was divided with the knife to the same extent as the integument, the lower margins of the internal oblique and transversalis muscles were cautiously raised up with the point of the finger, and the director passed beneath and as high up as before, and cut throughout to the very summit of the wound; in these several incisions not a teaspoonful of blood was lost. I next came down to the fascia transversalis, which in this subject was unusually dense; I made a slight division of it where strongest, at its lowest part, and then easily separated it upwards with my finger; until this was done I could not get my finger under the peritoneum; but once effected, the peritoneum was easily lifted together with the intestines from the iliac fossa, and the psoas muscle resting on the brim of the pelvis reached; the tumour, ascending even somewhat higher than was at first supposed, requiring a more extensive separation of the membranes than was anticipated. The position and extent of the external incisions enabled me to get at the artery immediately after its origin; the artery was not on the psoas, it hung over the inner margin of the muscle, curved into the pelvis; the intestines and peritoneum being well held by broad copper spatulæ over to the left side, the thigh was flexed, and I was enabled to get at the artery and lift it upwards and outwards with its vein. I found the sub-peritoneal layer of fascia binding the vessels together very dense; after a little manipulation I passed the aneurism needle between both, from before and within outwards; the eye of the needle being clear I passed a strong silk ligature through it, and then drew back the instrument, leaving the cord beneath the artery, and scarcely disturbing it at all, or the vein, from their bed. The ligature was put upon the stretch and the artery pressed upon it, and immediately the beat of the tumour ceased; the finger was lifted up and again the tumour throbbed; once more the experiment was made with a like result, affording conclusive evidence, as to what might be expected when the cord was tied upon the artery. This condition being confirmed by my able assistants, Professor R. Smith, Drs. Bennett and Little, the artery was ligatured, the ligature being strained with considerable force; immediately the pulse of the tumour was cut off, its heave ceased, its volume collapsed to less than two-thirds of its size; all sound ceased in it, the aneurism became silent. The wound was next dressed, its edges

superficial and deep, were brought together, the needle armed with silver wire was made to traverse not only the skin but also the tendinous and muscular structures. There seemed so great a tendency to protrusion of the intestines and peritoneum, that eight stitches were required to retain the edges together; in addition to those sutures, straps of soap plaster at suitable distances were applied to support the parts; and a few folds of lint soaked in carbolic acid oil were laid over these, and a couple of pads outside all, and which were maintained in position with a considerable amount of pressure, by long wide straps of adhesive plaster; a few turns of a broad flannel bandage around the abdomen, completed the dressing. The limb was then enveloped in French wadding and lightly rolled with a flannel bandage from the toes to the groin. Quickly after the artery was ligatured the patient recovered consciousness, the chloroform having acted most favourably, and I did not consider it advisable to keep him under its influence during the dressing of the wound.

The patient was next conveyed from the operating theatre on a stretcher to his bed, and without the slightest change of position laid upon it; the sacking was easily withdrawn. He lay upon his back, his head and shoulders being slightly raised; the thigh was gently flexed and the leg elevated, both being supported on pillows and resting somewhat on the outside; warm jars and India-rubber tubing filled with hot water were applied to the feet and along the affected limb, so as to secure its temperature; a full opiate (40 drops Battley) in some hot brandy and water was then given.

3 p.m.—All appearance of shock has passed away. His pulse 100, full; complains of great pain about the knee, particularly on the outer and inner walls; I attribute this suffering to the enlargement or dilatation of the anastamosing vessels, and have frequently observed it in a most aggravated form, in cases of popliteal aneurism undergoing cure by pressure on the femoral artery. The artificial heat was carefully kept up, and there was very slight diminution of temperature in the affected limb—only two degrees when contrasted with the sound one. Ordered 30. drops of Battley with 25 of sweet spirits of nitre every third hour, and three ounces of brandy every third hour; a small cup of beef-tea occasionally.

9 p.m.—Temperature of limb as at last report, quite warm and

comfortable, with the exception of the pain about the knee; has had some sleep, and is quite cheerful.

January 11th, 10 a.m.—Slept well throughout the night; pulse 98, good volume and steady; took his nutriment, opium, and stimulants as directed; skin moist; passed water freely and in abundance; the temperature of the limb well sustained, only one degree lower than the sound one, as indicated by the thermometer; pain absent about the knee all the morning; he took some toast and tea for breakfast; to continue the beef-tea, brandy, and opium at the same intervals, every third hour.

3 p.m.—The patient was in a tranquil sleep, and awoke as I entered the ward; he had no pain as before complained of; pulse 90; passed water freely; temperature of limb the same as in the morning; has taken everything as ordered in the morning; to continue.

January 12th, 10 a.m.—Slept well throughout the night, and took his nourishment, opiates, and stimulants, as directed; at nine this morning eat some toast and tea for breakfast. The patient is very bright, and feels no pain whatever, but complains a little of the restraint by position; pulse 86, soft; skin moist. I dressed the wound for the first time this morning; on removal of bandage, pads, plaster, &c., its edges seemed to lie very evenly together; gentle pressure over the wound occasioned no pain, but forced up a quantity of watery fluid and imperfect pus, highly fœtid, from proximity to the colon; this was soaked up with soft sponge as it escaped; the plasters, and pads, and bandage were re-adjusted as before, and all done without giving pain to the patient. The limb was next stripped; the tumour in the groin maintained much the same condition as after the operation; it was quite flattened and silent, no recurrent supply having reached it; temperature fully maintained to the very toes, and, by examination with the thermometer, strictly the same as in the sound limb; rolled the entire member in wadding with a flannel bandage as before, placed it in same position, flexed and supported upon pillows, with a hot jar to the sole of the foot; he passed water several times, and free from straining or pain; ordered to continue the opium stimulants and beef-tea every fourth hour.

3 p.m.—Has taken his nourishment with appetite; no pain; pulse the same as in the morning, 86, soft and compressible; skin soft; passed water abundantly; temperature of limb same as in the morning. To continue throughout the night opiates, stimulants,

and nutriment every fourth hour; position not changed; the limb lies slightly flexed at the groin and knee, resting on its outside, the leg being placed on a plane surface, and the foot raised about an inch above it; the limb was slightly flexed in this way to relax the artery and the tissues over the walls of the aneurismal sac, and the limb raised in the least degree so as not to embarrass the heart's action in sending blood through the anastamosing vessels for the due supply of the member; this small amount even of elevation being salutary towards favouring the returning blood, a most important point to pay attention to when the limb was struggling for life.

January 13th, 10 a.m.—Slept at intervals throughout the night, and took his nourishment as ordered; this morning took tea and toast with appetite. On examining him very carefully he complained of no pain; pulse 86, steady and full beat; urine passing freely; skin moist. On dressing the wound there was no pain in it or its vicinity; no redness, and the temperature of both limbs was the same. As stated before, the aneurismal tumour remains collapsed, and silent as to murmur from recurrent supply. Supported the limb by adjustment of cushions, as stated at last report; ordered to continue the opiates at intervals of four hours, also the brandy and nourishment.

3 p.m.—Slept nearly throughout the entire day, being partly narcotized; he partook freely, too, of nourishment and stimulants; to continue opiates, beef-tea, and brandy as before.

January 14th, 10 a.m.—The report this morning is most favourable in every respect. He slept soundly, and at stated times took food, stimulants, and opiates as ordered; suffers no pain; pulse 80; passes urine in abundance; skin moist over the trunk and extremities, and the temperature alike in both. He took his breakfast with relish; ordered opiates, stimulants, and beef-tea as on yesterday. The opiates I insist upon, although the man is half narcotized; as to its powerful influence I mainly attribute the absence of unhealthy inflammation, and the protection afforded to the peritoneum from being engaged.

3 p.m.—Feels quite happy after seeing his family and friends, now for the first time since the operation. He suffers no pain in the wound or limb, but complains of a troublesome cough with tenacious expectoration. Ordered the following expectorant and sedative mixture:—

℞. Liq. Hoffman 3i.
Tinct. opii. camph. 3iii.
Spirit amm. aromat. 3ii.
Tinct. scillss 3i.
Aq. lauro cerasi 3ii.
Syrup 3ss.
Aquæ ad 3viii. fiat mistura.
Capeat cochlearea ampla tertiis horis.

To continue the opiates and stimulants throughout the night, and beef-tea at intervals.

January 15th.—Slept quietly at night; pulse 86; temperature of body natural, with slight moisture; took all his nourishment during the night, and eat with appetite some toast and tea for breakfast. Dressed the wound, which looks very well; reddish at edges; with the slightest pressure a little matter was pressed out; re-applied straps, carbolic acid oil dressing, pads and bandages as before; to continue opium, brandy, and beef-tea at intervals of three or four hours; urine passed copiously and not high coloured; tongue cleaning.

3 p.m.—The patient had a slight rigor in the early part of the day, but it was quickly checked by the administration of some hot brandy and water with opium; pulse same as in the morning, 84; skin moist; has taken all his nutriment. To continue brandy, whiskey, beef-tea, and 30 drops of laudanum as before, every third or fourth hour.

January 16th, 10 a.m.—No repetition of the shivering; pulse 88; skin soft; cough gone; passed water freely; has eaten his breakfast with appetite, and taken all his opiates, stimulants, and nourishment throughout the night. Dressed the wound; surface of edges well vitalized; no pain on gentle pressure over iliac fossa, while at the same time some pus escaped, very offensive in character; re-applied all dressings as before; limb free from pain; tumour slowly diminishing; quite silent; natural temperature preserved to the very toes. To have some arrow-root and brandy, and to continue opiates, stimulants, and food as before.

January 17th, 10 a.m.—Had refreshing sleep at a time and for long periods; took his opiates, stimulants, and support at regular intervals; pulse very soft with good volume, 84; tongue moist and nearly clean. Dressed the wound, which looks very healthy; pressure with a sponge over iliac region gives no pain, yet wells up a small quantity of healthy pus. Re-adjusted adhesive straps, pads, &c.,

and removed the flannel bandage which supported the abdomen; on all former dressings it was slit up with seissors, and, after the pads, &e., were laid down, the cut edges were stitched together again; this preeaution was adopted to prevent the slightest motion or effort of the patient being made, for as yet he never changed his position from off of his baek. A fresh pieee of flannel, doubled to a suitable width, was gently passed beneath the patient, and pinned in front towards the left side, giving suitable support to the pads near the wound as well as to the entire abdomen; the man's linen was now also for the first time ehanged, and without ever allowing him to stir from the reeumbent position; ordered to eontinue the stimulants, opium, and nourishment at intervals of three and four hours. The opium has aeted most admirably in allaying pain and irritation, in warding off peritoneal inflammation, and keeping the bowels quiet for the entire week whieh has now passed since the operation; and the belly is flat, without tympanitis.

January 18th, 10 a.m.—The patient eat his breakfast with appetite; he slept throughout the night, only waking to take his nourishment and opium; pulse 80, soft; tongue elean; urine abundant; skin quite natural, and temperature of both limbs alike. Dressed the wound, whieh is suppurating healthily—some shreds of deadened cellular tissue and fibrous strueture at the margins of the wound. Removed the silver stitehes, some of whieh cut their way out, and others whieh maintain edges still in apposition. No pain on making gentle pressure with a sponge from within outwards over the iliae fossa so as to press out any diseharge lodged there. Re-adjusted straps, pads, and flannel bandages, so as to support all together as well as the walls of the abdomen, as on yesterday—to continue beef-tea, brandy, and opium at the same intervals, every third or fourth hour.

January 19th, 10 a.m.—Slept well and feels greatly refreshed; took all nutriment, stimulants, and opium as ordered; pulse 80, soft and good volume; temperature of body and limbs natural; urine abundant. Dressed the wound, removing the last of the silver sutures, pressed out diseharge very gently, and re-applied all the dressings as before.

3 p m.—Feels most eomfortable. Now, for the first time sinee the operation, ehanged all the sheeting on the bed; slipped them under the patient, without the least effort on his part, so guarded was I to preserve the ligature from any disturbanee.

January 20th, 10 a.m.—Had quiet and refreshing sleep; took

all his nourishment as ordered; pulse 80, with steady beat and full; urine passed freely; temperature of body and limbs natural. Dressed the wound, which looks healthy in every way; no pain on gentle pressure being made with a sponge over the iliac region for the purpose of dislodging any accumulated purulent matter.

January 21st.—Going on most favourably; he slept well all night; bowels opened twice and of their own accord, this being the first time since the operation, now eleven days; pulse 80, good beat and soft; tongue clean; asked for an egg for his breakfast which he eat with appetite. The wound looks very healthy, and is nearly all healed. The shreds of deadened tissue pressed out with the sponge, it being used very gently, the discharge is healthy in consistence and colour, but still exceedingly fœtid from the proximity of the bowel; brought the edges of the wound readily in apposition with adhesive straps. The upper part is healed, and the ligature rests quietly between its lips, at the junction of its upper and middle thirds; lint soaked in carbolic acid oil, and pads supported with straps and flannel bandages as before. The limb also rolled in flannel from the toes to the groin; to continue still his opium, stimulants, and nourishment at the same intervals of time.

3 p.m.—No complaint since morning.

January 22nd, 10 a.m.—The report of the patient's condition is most favourable in every way. Dressed the wound, which is granulating most healthily; no tenderness whatever in its vicinity, and all deadened shreds of cellular tissue removed. Reapplied straps, pads, and flannel bandages, support as before. The aneurismal tumour is steadily diminishing, and the temperature and feeling in the affected limb the same as in the sound one; to continue support, stimulants, and opium as before, every third and fourth hour.

January 23rd, 10 a.m.—Patient slept well all night and took his breakfast with relish; pulse 78, soft, good volume; tongue clean; urine passed abundantly. Wound dressed as on yesterday, it looks quite clean; and now that granulations are springing up in all directions and chambering off, as it were the bowel, the discharge is not at all as offensive as throughout the earlier stages of the case, and it is healthy in colour and consistence. The ligature lies quiet in the wound; to continue nourishment, opiates, and stimulants as before.

January 24th, 10 a.m.—The patient feels quite refreshed after a night's sound sleep, and eat a very hearty breakfast. The wound is rapidly closing, and granulations of a healthy character every-

where throughout it; above and below it is healed, and open at the junction of its upper and middle thirds, through which the ligature protrudes; dressed and supported the wound with adhesive straps, lint soaked in carbolic oil, pads and flannel roller as before; to continue stimulants, nourishment, and opiates at the same intervals as before.

January 25th, 10 a.m.—The patient had a very quiet night, with refreshing sleep. No pain in wound or limb, and, as on yesterday, the amount of discharge was merely sufficient to moisten the surface. As the time was closely drawing nigh for the separation of the ligature, I considered it better not to disturb the dressings.

January 26th, 10 a.m.—Everything going on most favourably; dressed the wound, which looks most healthy; a small amount of discharge on further pressure; re-dressed as before; to continue nourishment, opiates, and stimulants.

January 27th, 10 a.m.—Slept nearly the entire night, waking only to take nourishment; no pain; pulse natural; urine abundant; bowels confined; once moved only since the operation, and that was on the 20th, eleven days after the operation, and from that date up to the present (seven days) they have not been acted upon; wound so easy and so little discharge from it, considered it prudent to leave all quiet; to continue support and opiates at the same intervals of three and four hours as before.

January 28th.—All going on most favourably; wound not disturbed.

January 29th.—This, the twenty-first day since the operation, and the wound nearly all healed; no matter pressed out by the sponge; the ligature rests quietly in its bed; not much secretion about it; no pain of any kind; re-dressed the wound; to continue opiates and food as before.

January 30th.—No change; wound looks well, but little discharge; ligature undisturbed.

January 31st.—No change since last report.

February 1st.—Sleeps, eats, and takes his medicine and stimulants as before; wound nearly closed; ligature not meddled with.

February 2nd.—As at last report, all going on favourably, the twenty-fourth day since the operation; the ligature lies quiet in its position.

February 4th.—No change since last report; ligature undetached; wound all but healed; about a teaspoonful of discharge gently pressed out from the track of the cord.

February 7th.—Ligature not detached. In every respect the case is progressing most favourably. The patient's bowels were largely moved twice to-day of their own accord. This is only the second time they were acted on since the operation. To continue opiates and nourishment.

February 13th.—The case has favourably gone on up to this date; one of the most important of all, the casting off of the ligature. When dressing the wound, I made the slightest traction on the cord, when it came away thirty-five days after its application, and without a trace of blood after it; dressed and supported the wound as before. The ligature had been well tied, and was perfect in its integrity, and holding the external coat of the artery in its loop; ordered to lessen the amount of opium; one draught at night.

February 14th.—Scarcely any discharge from the track through which the ligature passed on yesterday, and the entire wound nearly healed. The tumour is rapidly reducing in bulk. What remains is quite solidified. The circulation and temperature of the limb is perfect, and all the unpleasant crampy sensations have for a long time left it.

February 16th.—Only a few drops of discharge from the track which the ligature left; no tenderness or pain of any kind. Since the opium has been stopped on the 13th, with the exception of the night draught, the bowels have been naturally moved every day or every second, and twice this morning, relieving all the fulness and distension of the lower part of the abdomen; dressed wound as before.

March 21st.—Several days have elapsed since last report, and still there are a few drops of healthy pus from the wound, not increased by pressure with a sponge over the iliac fossa or its vicinity.

March 28th.—At this date all the difficulties and dangers of the operation were overcome; the ligature safely away; the wound perfectly healed from its deepest part to the surface; the aneurismal tumour solidified, and undergoing rapid diminution by absorption. The patient could flex and extend both the leg and thigh without the slightest pain, the joints only being a little stiffened; the temperature and sensibility of the limb were at the same height, and as perfect as in the sound one. The patient was restricted still to bed, the limb being supported on pillows and roller from the toes to the groin with a flannel bandage, gentle pressure being made

over the tumour as it was passed upwards to encircle the abdomen and give support to its enfeebled wall on the right side. Up to this date everything had gone on well, and surgery had been triumphant in saving the man's life. However, by the indiscretion of the patient himself, in a short time his life was brought into jeopardy. Up to the middle of April (the 14th) he bore with steadiness the restrictions imposed upon him—confinement to bed, rest in the semi-horizontal position, and quietude of the limb. At this time the patient's whole condition was greatly improved; he was strong, put up a great deal of flesh, and was in excellent spirits. The aneurismal tumour had considerably diminished, and there was an entire absence of pain or uneasiness in the affected limb, and its temperature and sensibility were the same as in the sound one, and its motions of flexion and extension were quite perfect.

On the 25th of April the patient began to complain of weight and uneasiness in the tumour, and on examination I perceived there was some œdema of the thigh beyond its boundaries, there was also an increase of temperature. Together with these changes there was considerable constitutional disturbance; he felt hot and burning the evening before; refused all food, and vomited frequently; he had no sleep. I was astonished at the suddenness of this change, and, after some difficulty, owing to prevarication, made out the cause. For several days prior, the man was in the habit, after I left the hospital, of getting on his clothes and walking about in the garden for some hours together. He then admitted that after doing so on the third day he experienced an uncomfortable tightness in the limb; this sensation was relieved after going back to bed, and taking rest. Every day that he went out, from this time up to the date of this invasion of fever, he suffered more or less in the tumour and the limb; and towards the end of this period, though he sometimes suffered acutely, yet he was afraid to complain, and was in the habit himself of adjusting the flannel bandage, and absolutely concealing the mischief which he had originated by his own indiscretion.

The case now presented a most alarming aspect; rapidly the constitutional symptoms assumed the lowest type; the pulse was quick—125, very feeble, and sometimes intermitting; the tongue was dry, brown, and hard; the eyes suffused; the features pinched and shrunken; the skin dry and burning; the urine secreted in very small quantity, scanty, and high coloured. The stomach was,

after some time, quieted by repeated doses of hydrocyanic acid, with creosote and iced champagne, while the integument over this region was vesicated, the cuticle removed, and the raw surface sprinkled over with morphia. Brandy had to be given in large and repeated quantities to support and steady the heart's action, and strong beef-tea and chicken jelly for nourishment. The limb was evenly rolled in flannel as far as the knee, while all the swollen thigh was wrapped in flannels wrung out of hot opiate stupes, and enveloped in oiled silk; at the same time the limb was elevated to a considerable height, so as to favour the returning blood. By these means, the burning tensive pain was partly lulled; opium had to be given in large doses, in conjunction with stimulants, every third hour, and so at least modified rest was procured. This treatment, local and constitutional, was steadily persevered in for four days.

On the 3rd of May I found the constitutional symptoms were, in some respects, relieved, yet the local changes were far more alarming. The stomach had been quieted; light nourishment could be retained, and the abundant stimulants and opium taken sustained the pulse and modified pain. On examination of the thigh, it was fully twice the bulk of the sound one. The surface, particularly over the tumour, presented a purple reddish hue, and, on pressure, which created intense pain, a kind of boggy, imperfect fluctuation was communicated to the hand. It was quite clear now what had taken place: acute inflammation of a diffuse character had been set up in the sac, with imperfect suppuration. I decided on freeing the fascia, opening the sac, and turning out the entire contents. Ligatures, tenaculæ, broad curved spatulæ, and knives, being prepared, so as at once to arrest hæmorrhage, should it occur either by direct division of vessels during the operation, or from some vessel yielding a recurrent supply to the sac. An incision was made from about the centre of Poupart's ligament, extending downwards for about six inches over the most prominent part of the tumour, dividing the integuments, superficial and deep fasciæ. A director was passed for two inches lower down, beneath the fascia lata, and a straight, long bistuory was conveyed upon it; its edge then turned forwards, and the fascia divided by the withdrawal of the instrument, the integument not being cut. I have frequently drawn attention to the advantages arising by this subcutaneous method of cutting short, tensive inflammation of fascia. The knife was then carried through the anterior wall of the tumour, to the

same extent as the first incision, and immediately on its division a large quantity of grumous blood, broken up lymph, and imperfect pus gushed out, following the track of the knife. I next, with my fingers, turned out a quantity of solid coagula, of lymph and blood, and dressed the extensive cavity with lint soaked in oil, having previously brushed the entire surface over with a strong solution of chloride of zinc (twenty grains to the ounce). It was a fortunate occurrence that no arterial blood flowed after these extensive incisions, and the manipulation required to clear out the part of offensive matters. The leg was rolled in flannel bandages from the toes upwards, and the thigh likewise so supported, the bandages being made to cross so as to approximate gently the gaping parts, yet not to cover the wound. A large piece of flannel, wrung out of boiling water, was laid over the entire front and sides of the thigh, and covered with a sheet of oiled silk. This application was most soothing, and afforded much comfort to the patient. The limb was slightly flexed, and then steadily supported on pillows; heated jars were applied to the feet, and some hot brandy and water, with a full opiate, given. The shock which the patient sustained was soon rallied from, and a severe rigor which threatened, likewise cut short and averted.

3 o'clock p.m.—The patient has rallied well from the shock; pulse 100; had sleep for a couple of hours, which greatly refreshed him; limb lies quiet and free from pain; opiates, stimulants, and nourishment every three or four hours.

May 4th.—On the whole he is reported to have had a quiet night, some steady sleep. Indeed I perceive a marked change in the expression of the patient's face; it has lost a great deal of the dragged and haggard look; his pulse has come down to 98; the renal secretion is increased, and the skin has lost a great deal of its burning heat; by day the stupes are regularly changed every third hour; and at night when the patient awakens; to continue opiates, sedatives and beef-tea, chicken jelly, &c.

May 6th.—The patient's constitutional symptoms have greatly improved; his pulse down to 90, and with good volume, regular; tongue cleaning and getting moist; the man's expression is very cheerful, and he now speaks hopefully of getting well. I removed all the dressings from the limb, cautiously withdrawing the long strips of oiled lint which were placed in the wound, they readily came away; the large loose flaps were evenly supported from behind forwards, and a considerable amount of unhealthy discoloured pus

Drawings taken from Casts before and after Operation.

and scrum pressed out. All this was done very gently, the surfaces were again brushed over with the chloride of zinc solution, and the part then dressed and supported as before. There was but little pain complained of during even this the first dressing; to continue support, opiates, and stimulants abundantly.

After a similar manner the wound was treated up to May 10th, when its aspect was greatly changed for the better, and required another modification of dressing; at this time the discharge was very moderate in quantity and had become quite healthy in character; the loose flaps and integuments had recovered their contractile power, and were, in some places, adherent to the surface beneath. The wound, which had been fully six inches in length, was considerably shortened owing to the retraction of all the tissues; pads were now laid along the inner side of the thigh, and likewise on its outer aspect; these were drawn gently towards each other by broad straps of adhesive plaster; not to touch each other, however, but to give an equal pressure from the circumference of the large cavity towards the wound, and so press all secretion in this direction for escape, the edges of the wound not being brought together, it being bridged over by the plaster passing from one compress to the other, and thus afforded an unobstructed drain.

May 13th.—A similar mode of dressing to that described in last report was continued up to this date, and now the flaps are all adherent, the limb is perfectly free from pain, and on pressure no discharge wells up; it is consolidated throughout. The edges of the wound are drawn together with adhesive plaster, and the thigh and leg rolled as before. The patient has gained considerable health and strength since last report. The large quantity of stimulants and opiates has been diminished, and he partakes every day of solid food.

May 25th.—The wound is now healed, and bears being handled with impunity; he is able again to flex and extend the leg and thigh without uneasiness. The whole aspect of the man is changed in a most remarkable way. The anxious, haggard expression which he had on admission to hospital, and again when the diffuse inflammation attacked the thigh, is altogether gone; he has put up flesh in a rapid manner. At this time I took an accurate cast of the abdomen and thighs down to the knees, and the drawing from it shows well the increased bulk of the limb, the position of the wounds—the one for ligaturing the artery, and that for liberating the fascia of the thigh and evacuating its disorganized

contents. It contrasts well with the drawing beside it, copied with great accuracy from a cast which I took from the man before the operation. The tumour is well delineated in all its aspects, and the emaciated condition of the limb speaks forcibly of his weakened state at this time. (See Plate II., Figs. 1 and 2.)

The frontispiece to this paper has been beautifully lithographed by Mr. Forster, from a fine photograph taken by Mr. Lesage from the patient, a month after he had been walking about quite well. It will be seen that the man stands quite erect, and from this position the abdomen is more prominent than the representation in the cast taken in the horizontal position; also, for a like reason, the cicatrix in the abdomen appears nearer to the lip of the ilium in the figure copied from the photograph than it does in that taken from the plaster cast.

The daily account which I considered it right to give of this most important case may appear tedious to some, but I cannot regret having done so. From the very first the aspect of the case was alarming, considering the advanced age of the man, his emaciated condition, the enormous size of the tumour, its extension above Poupart's ligament, and its almost entirely fluid contents. Again, it was essential to dwell upon the many changes made in the local management of this case immediately after the operation, during the long time of the detention of the ligature, and after the separation of the cord; so far may be considered as the first part of the case; well, then, the secondary or after part of the case surely affords one of the most instructive lessons in practical surgery, when, by the man's recklessness, his life was again imperilled, yet by the boldness of the measures adopted his life was secured, and his limb preserved in every respect as perfect as the other. The extensive division of the fascia of the thigh, and the laying open of the entire extent of the tumour; the turning out of its contents and all decomposed, pent up extravasated matter, required special notice, as well as the various modes of dressing the wound, as put in practice from the first brushing over of the entire exposed surface with the strong chloride of zinc solution, to the last application of straps, pads, and bandages, which, brought together, supported and healed its edges. Finally, it was essential to give the daily account of his constitutional management, in order to show the large quantities of stimulants, opiates, and nutriment required in so serious a case, and which were exhibited with so much advantage—all conspiring to sustain nervous power; to calm and allay irritation;

FIG 1

FIG 2

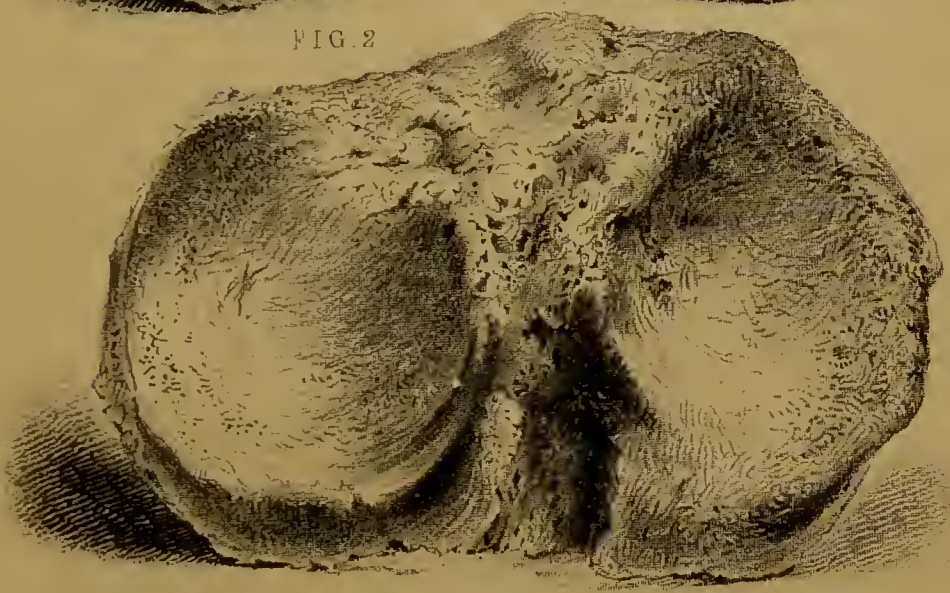
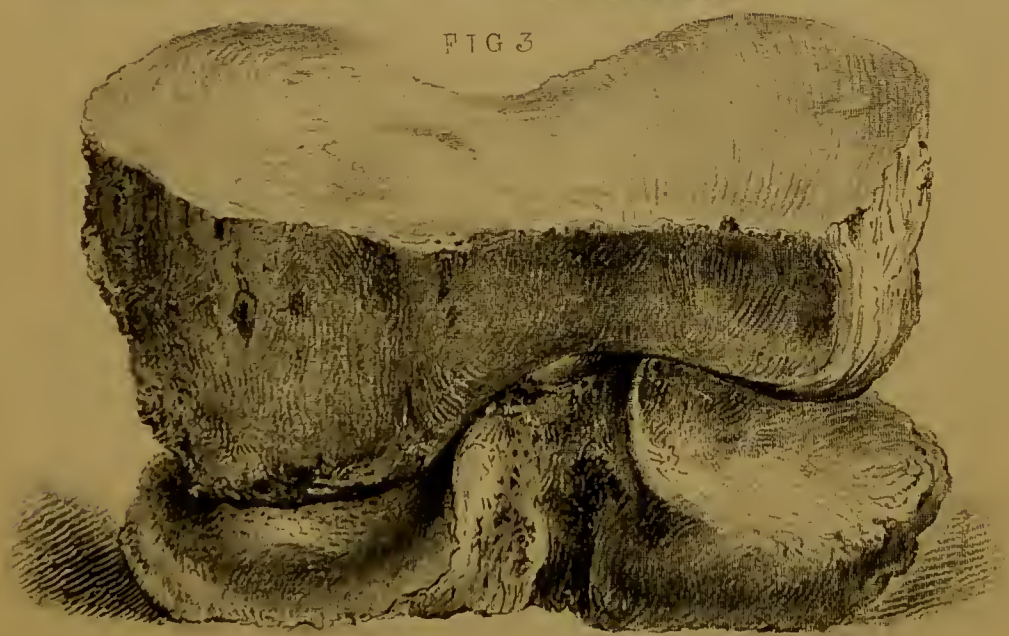


FIG 3



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to sustain the heart's action; to afford that recuperative power manifested in the local changes as described, and so essential for recovery.

II.—*On Excision of the Knee-Joint; with the History of another successful Case after the Operation; also Examples of the Bones solidly united, and in the direct Axis of the Limb; with Illustrations of a Man operated on twenty years ago, and of his condition now, the limb remaining as perfect throughout this long period as when he was dismissed from the Hospital.*

Having recently performed several operations for resection of joints, in Sir P. Dun's Hospital, I shall in the present paper allude to the subject of excision of the knee, as it will afford me an opportunity of again drawing attention to this admirable operation, the advantages of which I repeatedly wrote about nearly twenty years ago, and illustrated by several cases successfully cured.

William Smith, aged 26 years, was admitted into Sir. P. Dun's Hospital with incurable disease of the left knee-joint, April 28th, 1869. His history runs as follows:—Two years before the above date he fell from a car, being thrown violently off, and suffered some contusions; the left knee in particular was badly bruised and twisted. After this accident he was confined to bed for several days, the knee-joint being attacked by acute inflammation; the usual remedies, leeching, stuping and rest in the horizontal position, were had recourse to, and the severe pain subsided; at the expiration of about three weeks he was able to go about, with the assistance of a stick. Six months passed by, when he again met with another injury, and the knee-joint became inflamed again; he sought relief in an hospital, and was confined there for two months before he would be allowed to move about; on his return home he had to remain quiet for several weeks before the limb was sufficiently strong to resume work; at several short intervals he had to lie up for a few days at a time, until four months before his admission to hospital at the above time. During the latter four months he suffered most acutely; the spasms and jerking of the limb preventing sleep altogether, the joint becoming greatly swollen, and most sensitive to the touch; ultimately a large abscess formed to the external side of it, burrowed backwards, and burst; the escape of matter was followed by some relief from pain for a time, yet the man became much weaker, and lost flesh rapidly;

the spasms of the limb and the pain in the joint continuing, and his constitutional state gradually becoming worse, he placed himself under my care. The following was his state at this time, just before operation:—The patient was greatly emaciated, with a pulse never under 120; his sleep was constantly interfered with by jerking and spasms of the muscles of the affected limb; his tongue was red, and indicative of great constitutional irritation; he had but little appetite, and constantly rejected his food; he felt hot and burning towards the close of day, and very frequently perspired freely towards morning—in short, irritative fever was verging fast into hectic. The local changes were well marked on the affected limb; the thigh and leg were emaciated, the former in the most marked degree, as contrasted with the sound one; the entire joint presented somewhat a globular form from the thickening of the structures, and deposition of new material on the external and internal walls of the joint; the hollow at either side of the patella was obliterated, owing to a similar change, while the popliteal space was considerably encroached upon by thickening of the posterior wall of the joint and morbid deposition in this region; the patella was not very prominent, pressure upon it created great pain within the joint; pressure around the articular margin of the tibia and femur gave intense pain, whilst pressure of the tibia upwards against the femur, either steadily or by a smart blow on the heel, produced a similar result. On seizing the thigh in one hand and the leg in the other, and moving them in contrary directions, considerable motion was allowed between the ends of the bones, proving clearly the disintegration of the structures within the joint, and the destruction of the crucial ligaments. Indeed this conclusion was arrived at without the test just mentioned being applied, for it was evident on handling the anterior surface and articulating edge of the tibia, that it had receded further back considerably from the condyles of the femur. From a consideration of all the circumstances bearing on the case, both local and constitutional, the opinion I arrived at was, in order to save life, the source of irritation must be removed. Then, the question settled itself into—what operation was most suitable to the case? Considering the age of the patient, and the limited extent to which disease had attacked the bones entering into the joint, their articular surfaces being alone implicated, I had no hesitation in advising excision of the joint in preference to amputation of the thigh; the patient's entire feelings centred in this conservative measure, and the

successes which I had obtained in several cases made me look with confidence to the result. A very careful stethoscopic examination was made of the man's chest, and the lungs, heart, and great vessels pronounced healthy. On the 24th of April I operated after the following manner:—

The patient being placed upon the operating table, he was quickly brought under the influence of chloroform, and then gently drawn down towards the end of the table. Standing on the left side of the table, an incision was made fully three inches and a half long on the inner side of the joint, the knife being laid on about an inch below the articular surface of the tibia, and carried upwards above the inner condyle of the femur; a similar incision was made rapidly upon the outside of the joint from over the head of the fibula, and carried upwards to a similar extent on the external condyle; thus, the two lateral incisions lay as it were on a level with the posterior wall of the joint, and were carried down to the bones; the third incision—the completion of the H—was rapidly made from within outwards, passing beneath the lower border of the patella; the patella was quickly liberated by a few sweeps of the knife from the upper flap; the limb being now flexed, the thigh slightly on the pelvis, and the leg fully upon the thigh, the extensive destruction of alar and crucial ligaments, together with the inter-articular cartilages and cartilages of incrustation, were at once revealed; on these changes I shall speak more minutely after describing the further steps of the operation. Some tense bands and shreds of the internal and external lateral ligaments had to be divided to attain the full flexion of the leg which I required to satisfactorily get at the posterior wall of the joint; this fibrous structure, strengthened by the expansion of the semi-membraneous muscle, I detached with the knife from the edge of the tibia, only to about the eighth of an inch in depth, and then forced down the fibrous structure from the tibia to the required extent—about half an inch—and so, in a similar manner, liberated it from the femur, without encroaching at all on the popliteal space; thus, then, the posterior wall of the joint was left in perfect tact, though detached from the extremities of the bones, and the lateral incisions lay on either side of it as drains for the escape of exuded fluids that must be in front of it; the fine blade of Butcher's saw was then applied to the head of the tibia, and a slice about three quarters of an inch thick, removed—cutting from behind forward; the saw was then applied in a similar manner behind the condyle

of the femur, and the section completed forward, removing fully two inches of the bone; both sections revealed healthy cancellated structure, and on being applied to each other, the surfaces lay accurately in contact. The disorganized and thickened structures round the joint were clipped away, the flaps thinned but not curtailed in length. The hæmorrhage was very trifling; two small vessels were ligatured in the outward wound. The patient was next drawn well up upon the table, and the box which I use in these cases being placed beneath the limb, the padding was accurately adjusted so as to give full support to the popliteal space, to receive accurately the calf of the leg, to maintain forward the tendo Achilles and the heel, so that the limb should be steadily sustained, from one end to the other, as the normal one rested on the bed; during this time the thigh was kept well pressed back by an assistant, and prevented from starting forward. The wound was next carefully sponged, and each little coagula picked away, until the surfaces of the flaps were rendered entirely clear from blood; the upper and lower were brought in contact, and held so in their transverse relation by four points of silver wire sutures; the lateral incisions were also drawn together by two points above and below the line of section of the bones; on either side of the limb there was no tensive strain upon them by this adjustment corresponding to the line of section of the bones; there was a free egress for any secreted fluids within; and this drain, if I may use the term, lay exactly in a transverse line with the posterior wall of the joint where stripped from the excised bones. The internal side of the box was next lifted up, the padding being arranged so as to give natural support, that is, filling up all spaces, particularly below the knee, and again below the calf to the internal side of the foot. The foot was maintained at nearly a right angle with the leg, its normal relation. The internal side of the box, so padded, so applied, was thus held strictly vertical, and then the external side of the box was elevated, and with a similar exactitude, padded and adjusted to the outer side of the limb, great care being taken that the position of the adjustment of the cut bones should be sustained on the outside, and no lateral displacement permitted; the foot-board, padded, was next placed in the grooves for its reception, keeping well pressed up the foot and leg, the latter steadily against the femur. The anterior splint, well padded, was then applied in front of the femur from the groin to about two inches beyond its end, taking the place of the hands of

PLATE 8

FIG 1

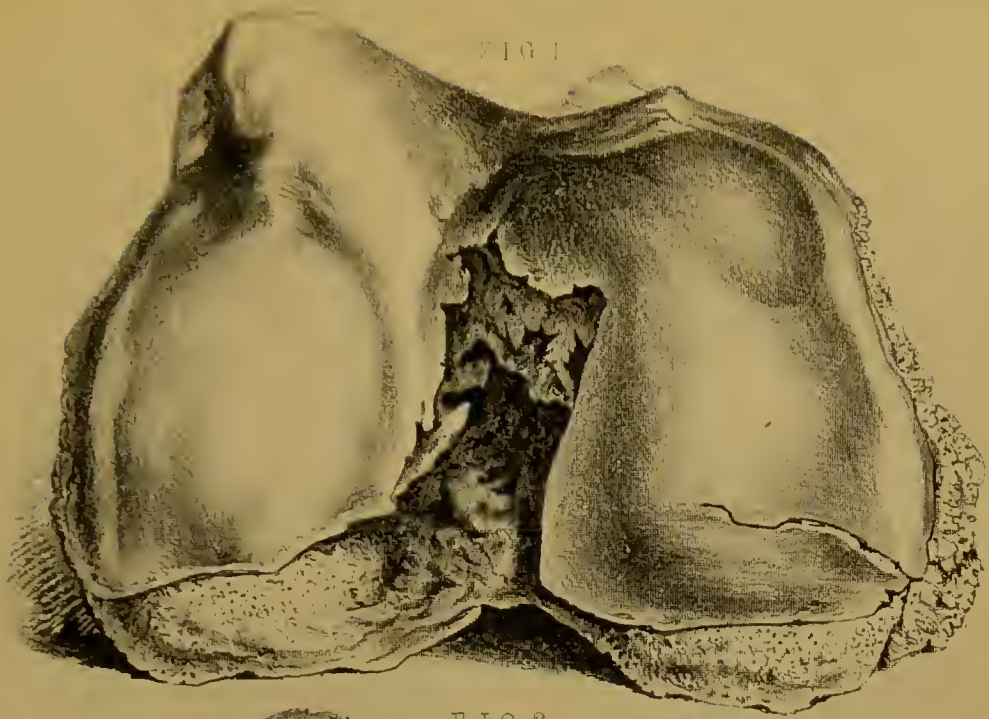


FIG 2

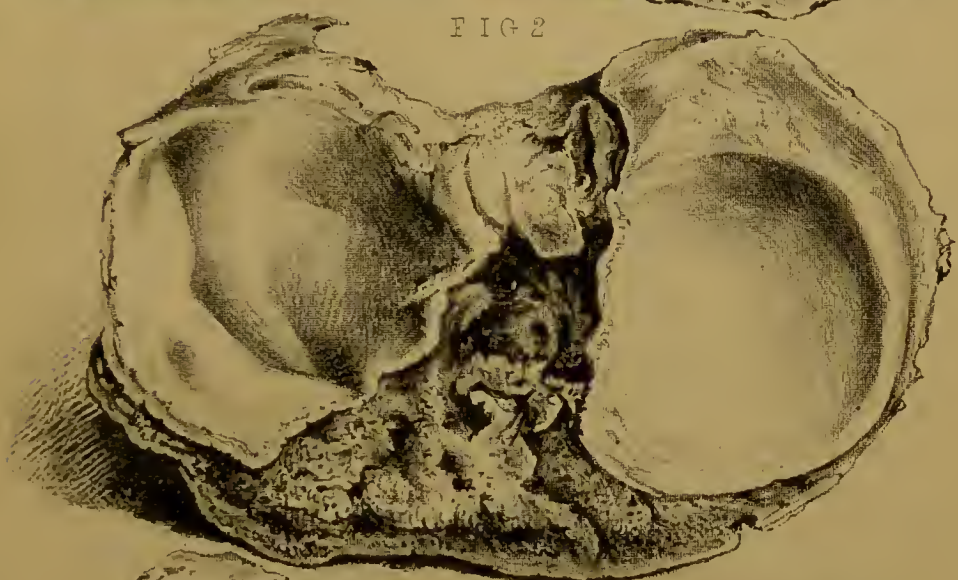
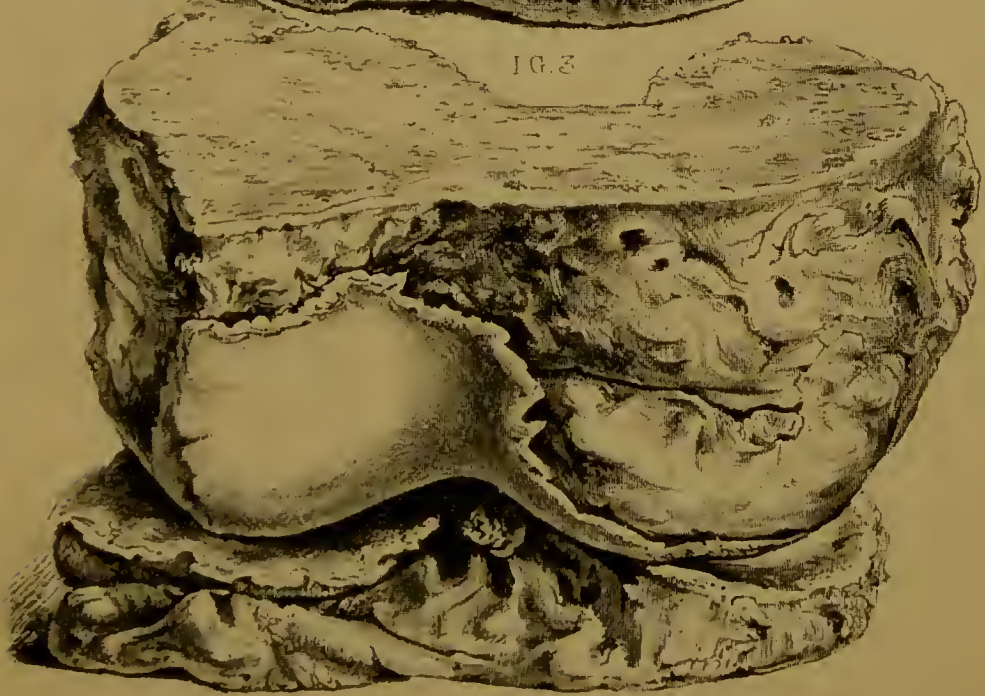


FIG 3



Foster Sc. Lith. Dublin

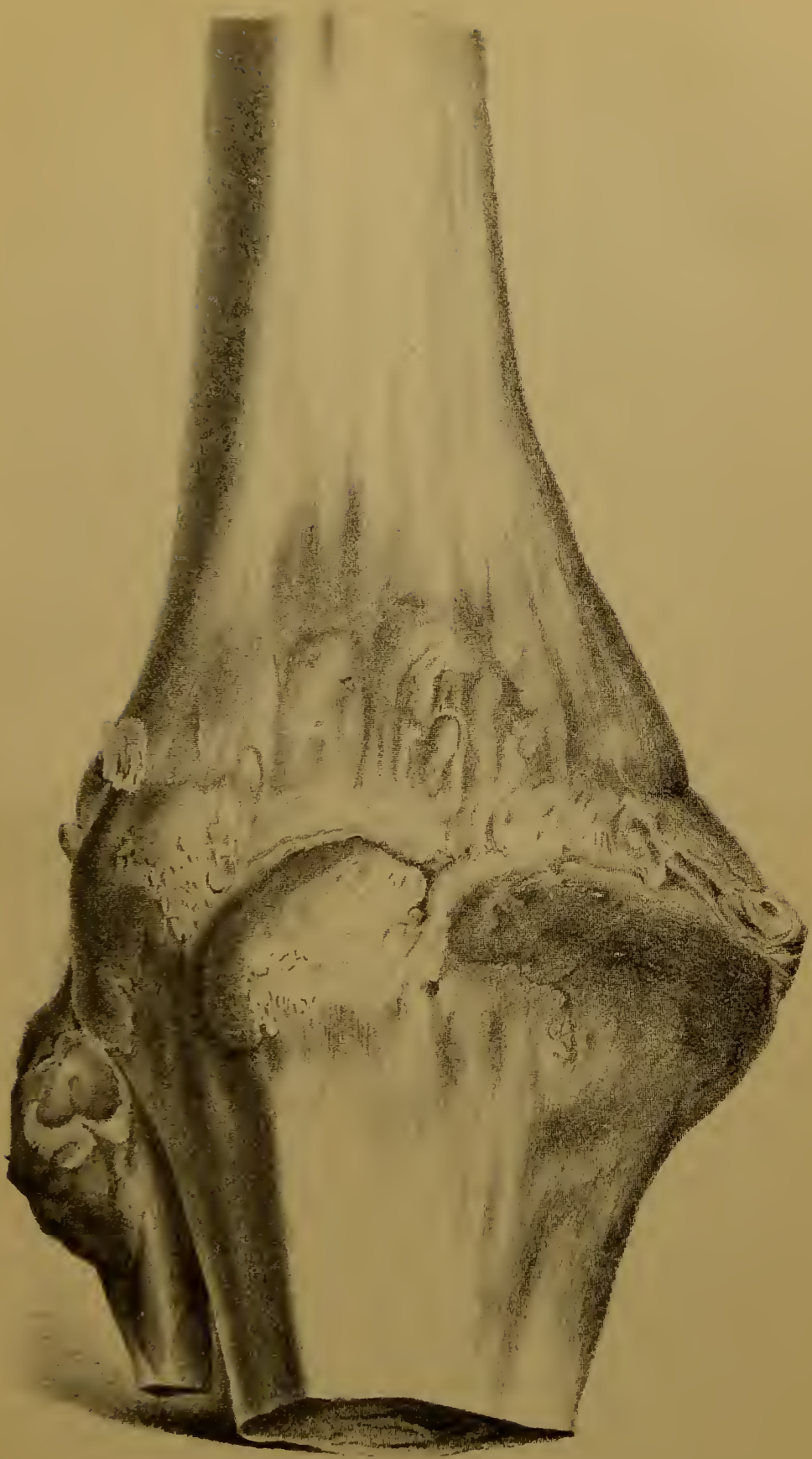
MR HUTCHER ON EXCISION OF THE KNEE JOINT

the assistant, who controlled backward the bone during the several steps of the dressing; the straps and buckles were then made fast, two over the leg, one above the ankle, a second a hand's-breadth below the knee, three over the thigh, one outside the anterior wall, just over the cut surface of the femur, a second over the middle of the thigh, and a third just below the groin. The external side of the box, which passed as high as the arm-pit, was steadied to the side of the trunk by the web belt adjusted to the apparatus. The patient, being entirely recovered from the chloroform, was removed to his bed, supported steadily in the horizontal position; the bed was a firm one—a straw palliasse, upon which was placed a hair mattress, and upon this even surface, the patient was placed. A pillow was put beneath the lower end of the box, so as to raise the limb a few inches, and so favour the returning circulation; the head was supported by a soft pillow at a comfortable angle with the trunk; I may here add, interposed between the sheet and the mattress was a folded blanket, which I have always found a safeguard against stripping from the restricted position required; an opiate and stimulant draught was given, and soon the patient fell into a quiet sleep.

Now I shall say a few words as to the portions of bone removed:—Their examination was most satisfactory, as establishing the conclusions which were arrived at before the operation. The bones have been most accurately depicted in Plate No. III. Fig. 1 presents the end of the femur; its entire cartilage of incrustation was eaten deeply around the edges, particularly behind, and the cartilage covering each condyle only adherent by a very weak bond, almost necrosed, so that on macerating the specimen for a few hours to discharge the blood, they eventually fell off, leaving the carious surface as exhibited in the drawing, with several deep eaten pits, and irregularity of surface from morbid changes and absorption. So likewise by a reference to the same Plate, Fig. 2, may be observed a similar disintegrating process brought to bear on the section of the head of the tibia; it is stripped of its cartilage of incrustation; it is pierced here and there at deeper intervals into the cancellated texture, and on the whole presents a very remarkable resemblance to the same destructive process which has acted on the femur, so likewise was a portion of its cartilage necrosed. The cartilage of incrustation of the patella was not affected in a similar manner; this I have preserved with all the bones from which the drawings were taken, in my museum. In

this same Plate, Fig. 3, I have placed the cut sections of the bones removed in their natural apposition, showing the amount taken away, about two inches three-quarters in depth.

The day after the operation, the 25th, the patient was in a most satisfactory state, his pulse had come down fifteen beats, his whole expression was changed for the better, he slept quietly nearly through the entire night, awakening only to take nourishment and stimulants. He was placed upon opium, a grain every third hour, and so it was continued, producing its soothing influence throughout the entire night; the limb rested quietly; no pain in it. In this condition he continued, without the least unfavourable symptom, until the 2nd of June, more than a week from the operation; stimulants and opiates were abundantly administered throughout these days after the operation. At this time I carefully let down the external side of the box, and removed a few soiled folds of lint and a pad; the anterior splint being all this time kept forcibly held back by an assistant, and also the internal side of the box steadily maintained in its vertical position; another assistant steadying the foot and foot-board resting in the groove of the internal side of the box. It was most remarkable how the extremities of the external wound all healed by first intention, the central portion corresponding to the back of the joint only remaining open, and through which some healthy pus and oily serum were discharged; the silver sutures were cut out, and the bond of union was perfect between the opposed edges; fresh lint and oil was laid on a thin pad laid over the part, and next the side of the splint was elevated; a similar arrangement was carried out with regard to the internal side of the limb; the wound here also seemed most healthy, and healed above and below, as on the outside; the silver cords were cut out and a pledget of lint steeped in oil laid on; the internal side of the box was next raised, and all being steadily in relation, the straps were buckled tight as before, and the anterior splint, which was firmly held back by an assistant throughout the dressing, secured in its position by the three straps which had been relaxed. From inspection of the wound nothing could be more satisfactory, the tibia and femur rested evenly and steadily against each other, not the slightest displacement laterally or from before backwards had taken place, so well had the mechanical appliance fulfilled its indication. The wound was most healthy internally and externally, nearly healed throughout by first intention, and any secreted fluids from between the bones was allowed



Drawn from Nature by Sarah Hunter

SECTION OF EXTENSION OF THE KNEE JOINT

From a Specimen of Osseous Union of the Bones

a free egress at either side. The transverse line of the flaps in front was entirely and firmly healed by first intention, and the silver sutures taken away; nothing could be more rapid than all the changes effected for good in this case. The constitutional symptoms were disarmed of all their momentous import, the pulse down, the sleep quiet, the appetite sufficient to relish the amount of nutriment required to sustain the feeble powers of life; the absence of all pain in the cut parts, the healthy action set up for repair, and the steady advance towards cure, all brought about within a few days.

It is not necessary to continue the daily report of this case. The dressing of the case was conducted with the same steady carefulness as just reported, and the stimulants and opiates were as abundantly continued as at first prescribed. At the end of the fifth week the bones were firmly united together, and the wounds all nearly healed; some healthy pus was discharged from about the centre of the internal and external wounds; the limb could be lifted by the heel from the box without pain, and in one rigid piece. All the appliances were as steadily persevered in as at first, and at the end of the seventh week the internal wound was healed altogether, and the external one only yielding a few drops of healthy pus; the firm nature of the union was quite established. With this persistent improvement of the local changes from the first, so also were the constitutional symptoms ameliorated; the patient had regained strength, and was putting up flesh in a very remarkable manner. Unfortunately at this time the man got cold and inflammation of the lungs, which rapidly ran into acute phthisis, and which carried him off in an incredibly short time. I was fortunate enough to secure the bones, which are united together, and form a very beautiful and instructive preparation, which I shall briefly describe. The flaps were firmly united at their edges and to the bones beneath, a small aperture only remaining in the external wound; no force exerted by the hands pressing the femur and tibia in contrary directions, from before backwards, or from side to side, could produce the least motion. I next dissected off all the soft parts down to the bones and carefully around the line of union; the fibrous junction was quite apparent, and even hard on being struck with the scalpel. On dissecting behind the bones, particularly towards the inside, large layers of newly organized lymph smoothed their external surfaces; and on this semi-cartilaginous structure being taken away the firmer bond was as clearly developed

as in front. Here, then, in so short a period was established a firm cartilaginous union passing rapidly into bone, and the bones in the most perfect position in a direct horizontal line; this, I am certain, can always be obtained, if the same means be adopted, and the same carefulness in the adjustment of the several parts of the mechanical appliances be attended to, particularly at the first, or the early management of the case. If union is denied at first from careless dressing, from moving the parts or permitting them to be moved after the first adjustments, the case will be long and tedious, as in the soft parts, if disturbed, union by first intention is interfered with; so in excision, if the lymph thrown out between the bones throughout at the cut surfaces be shaken, unsteadied, the glueing of the parts is broken through, the first union is denied, and then the secondary method of repair must be depended on—suppuration, with its reparative product. This is why I insist so strongly on the use of my own box in cases of excision of the knee-joint, because if the limb be adjusted as I have laid down, with no meddling interference, the result will be obtained as I have given—firm union of the cut bones in the shortest period possible.

The firm, almost osseous, union of the bones in a direct line is faithfully shown in Plate No. IV., accurately drawn from the preparation by Mr. Thomsohn, and I have introduced from my work on *Operative Surgery* a drawing from a similar preparation also in my possession, of firm osseous union obtained in the accurate axis of the limb after excision (see Plate V.), and thus noticed in the work referred to, p. 168:—"Plate XII. is a beautiful engraving, taken accurately from the valuable preparation in my possession; it illustrates the condition and perfect axis of the bones solidly united, grown into each other by one osseous bond." In order to enhance the value of this beautiful preparation I think it is well to exhibit the amount of diseased bones cut out. Plate VI. shows the portion of bones excised in their diseased state, separately and together (*Operative Surgery*, Plate II.). I have the greatest satisfaction in being able to produce these proofs of the possibility of uniting the bones perfectly by osseous union together, and in the proper axis of the limb, preserving its symmetry. Unhappily the opinion of a great surgeon, now gone, remains expressed as to the uselessness of the limb after excision; any opinion given by this bold surgeon must be received with reverence; yet truth must usurp its own place, and in contradiction to so great authority facts alone can decide. The late Sir James Syme writes:—"Although

PLATE 8.

FIG 1.

FIG. 2.

FIG. 3.

Forrest & Co. Lith. Dublin

M^r PUTCHER ON EXCISION OF THE KNEE JOINT.

Bones removed in the case of John Gaine separately

the operation (excision) has been limited to cases favourable for recovery, a large portion of the patients whose fate could be regarded as decided had perished. In some cases there had been no osseous union, and in others anchylosis, with miserable deformity. Thus in Sir Philip Crampton's only successful case, the famous one of Annie Lynch, who could walk the length of a day, it appeared, from the bones which were in Lincoln's-inn Fields museum, that the tibia and os femoris were united at a right angle, so that the progressive motion must have been of a very rare and remarkable kind; while the subject of Mr. Park's never-to-be-too-frequently-quoted case probably made a better appearance climbing up the rigging of his ship, like the quadrumanous inhabitant of a tropical forest, than he would have done as a biped on terra firma."—*Edinburgh Journal*, July, 1853, p. 99. The cases which I have adduced, and the illustrations from the preparations in my possession, prove, *that the limb after excision of the joint may possess perfect symmetry, the bones being accurately and osseously united in their proper axis.*

I do not believe that swinging apparatus, or a milder means of steadying the limb—such as M'Intyre's apparatus—and many others in use, can be effective; the lateral supports are deficient; the anterior pressure, as represented in my box, is wanting; the wavering condition enjoyed by other contrivances, all lead towards either anterior, posterior, or lateral displacement of the cut surfaces of the bones. These wandering views as to the management of the limb after operation have conspired, I think, in a great measure to shake the confidence of those in the profession who know but little, practically, about the operation.

Some years since I laid down the following rules. I have turned out, successfully cured, many cases according to their direction, and I bring forth one, lately operated on and cured, to prove the certainty with which a satisfactory issue may be looked for if the observations which I have so strenuously urged be strictly adhered to:—

1. *The judicious selection of the case.*—The bones not being diseased far beyond their articular surface, which, if upon section found to be a little more than had been expected, the part should be gouged out, or an additional thin slice removed; but if to a greater extent, amputation should be at once resorted to, and as recorded in my work on *Operative Surgery*, with a hope of excellent success. Again, amputation, as I have shown, may be performed some days after excision, should any unfortunate

circumstance in the management of the case demand it. I have recorded seven instances of amputation of the thigh, and all made rapid recovery save one.

2. *The* H *incision should be preferred*, and the perpendicular strokes placed well back, just in front of the posterior wall of the joint, so as to allow all fluids and discharges to drain off—far more effective and safer than any opening made in the popliteal space. No portions of the flaps should be curtailed, though they may be thinned of any thickened fibrinous matter or diseased synovial membrane; the latter particularly should be clipped away with a strong scissors. All ligamentous fibres, both around and within the joint, should be cut through, and the extremities of the bones fairly freed and exposed, great caution being taken not to break up the posterior wall of the joint. It should be set free from the bones in this way:—This fibrous structure, strengthened by the expansion of the semi-membranous muscle, should be detached with the knife from the edge of the tibia, only to about the eighth of an inch in depth, and then the fibrous structure forced down from the tibia to the required extent with the handle of the knife, and so in a similar manner it should be set free from the femur.

3. *The patella should be taken away in all cases, whether diseased or not*, and then the section of the bones, well thrust out in front, should be made with "Butcher's saw," from *behind forward*, due attention being paid to the axis of the thigh-bone at the time of its division, that the section be strictly at a right angle with the shaft; by this means *the artery* (popliteal) *is safe.*

4. All bleeding vessels should be tied, or any that have sprung or retracted should be drawn out and secured, so as to guard against intermediary hæmorrhage.

5. *While the patient is yet on the operating table, the limb should be placed in the horizontal position, either by gentle and steady traction, combined with pressure of the cut surface of the bone backwards, or, if necessary, the division of the hamstring tendons.* Their support behind in every case I look upon as of great value, therefore their section must be looked upon as a bad expedient towards straightening the limb.

6. *During the adjustment of the bones, great caution should be exercised that their surfaces should be, throughout their extent, in contact, and that no soft parts intervene.* The flaps should be then laid down and connected by suture closely throughout their transverse division, while the lateral incisions should be brought

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MR BUTCHER ON EXCISION OF THE KNEE JOINT

Bones removed in the case of John Gaine.


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together only at their extremities by one or two points, and the central portion of each left open just in front of the posterior wall of the joint, and lightly dressed with lint soaked in oil, thus affording a ready outlet for the escape of fluids. The extremity should next be cautiously laid upon "Butcher's box-splint," padded to the natural configuration of the limb, its sides elevated, foot-board applied, suitable pads introduced, and then the anterior splint laid on, taking the place of the assistant's hand, which, from the first, restrained the femur from projecting forward; then the straps buckled, the waistband applied, and the patient may with safety be removed to his bed. The bed should be prepared in this way, and consist of a couple of hair mattresses, laid one upon the other, evenly supported, and, intervening between the upper one and the sheet, a folded blanket, with feather pillows for supporting the head and shoulders; the bed should be moderately warmed, so as to prevent the patient being chilled when put into it.

7. *The limb should not be disturbed for several days*, the length of time depending a good deal on the season of the year when the operation is performed—whether it be in the heat of summer or in the cold of winter. After five or six days it may be necessary to let down the sides of the box-splint, to remove discharge, change internal pads, or soiled dressings, &c. By the apparatus named, the facilities for cleansing the limb are so efficient that it may not be required to lift the member from its support for even so long a period as six weeks, as evidenced in my own practice. Should, however, it be considered expedient to change all the dressings, the anterior splint should be steadily held back by assistants, and the limb pressed up to it, thus guarding against any starting of the femur forwards, or displacement laterally when lifted from its bed. When the box is prepared and freshly arranged, the limb, controlled after the manner mentioned, should be laid down, the side splint elevated, foot-board secured, and the straps over the anterior splint first tightened, so as to maintain it in that position, from which it was never suffered to change. I would impress the advice still further—if the straps be loosed for any purpose, *the hand of an assistant should steadily keep the anterior splint in its position*, and well pressed back, until the artificial support is again brought to bear upon it, and fastened.

8. *In cases where large abscesses form in the vicinity of the excised joint, or up along the thigh, Chassaignac's drainage tubes may be used with the best hopes of success.*

9. *The free administration of stimulants and sedatives is imperatively demanded in all cases of excision*, regulated to a certain extent by age, sex, temperament, and habits.

Nearly twenty years ago, when first writing on the subject of excision of the knee-joint, I stated that *the symmetry of the limb could be preserved and also its usefulness.* I am glad—it is a great pleasure now—to confirm this opinion, nearly twenty years having passed by. On the 20th of January, 1854, I excised the knee-joint from a man, John Gaime, aged 43, for incurable disease of the joint. He made an admirable recovery, and on the 8th of December, 1854, I described his condition as follows:—"He stands erect, without the slightest droop; from being an emaciated worn creature, he has become large and fat, with the entire muscular system well developed; the sickly hue and haggard expression have left his face, and he now looks cheerful and happy; he feels in admirable health. On closely examining the limbs, the affected one has nearly recovered its dimensions and muscular tone, the thigh perfectly so; it preserves an accurate axis with the trunk, but is slightly straighter than the sound limb. The adapted surfaces of the tibia and femur are bound together by a rigid permanent union; grown into each other, they are immovably fixed. The motions of the limb, effected by the muscles of the hip, are very perfect. When in the horizontal posture, the patient can elevate, depress, or rotate inwards or outwards the limb, with the greatest precision and accuracy; he possesses a like power in executing those movements either rapidly or slowly. Unsupported, he can sustain the entire weight of his body upon the limb unassisted by stick or cane. He can walk steadily with scarcely any perceptible halt, the limb being one solid piece. The amount of shortening is not very conspicuous, being two inches; it is not much greater than is absolutely necessary for the perfection of progression under the circumstances. A layer of cork beneath the heel, inside of his shoe, fully compensates for the loss and conceals all deformity. The motions of the ankle-joint are perfectly preserved. It is true that, on first making the attempt to walk, even for a short distance, he complained of uneasiness, and feeling tired first in this joint, but never referred pain to the knee; this enfeebled condition of the ankle may be fairly ascribed to the maintenance of the limb in a constrained and straight position for such a length of time; it has been, however, only a temporary uneasiness, which gradual exercise and time have


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MR BUTCHER ON EXCISION OF THE KNEE JOINT

Picture of J Grime taken nearly 20 years after the operation

[illegible] OF THE [illegible]NEE JOI[illegible]

[illegible] taken now, October 1872

[illegible] the operation, the Limb perfect

removed. The patient can now walk without any support. He plants the limb firmly upon the ground without being sensible of the slightest concussion, and feels confidence and satisfied in its strength. On the day before yesterday he walked to the Park and about the grounds, a distance of over four miles, assisted by a walking-stick, and he assured me he was not in the least degree fatigued or the worse for it. Ever since the man left the hospital, now nearly three months ago, he has followed his trade as a shoemaker, and in this business the limb is of great service, for it is necessary to grasp the shoe between the thighs at their lower part, so as to steady it for stitching; this he is perfectly able to accomplish by supporting the limb upon a form; had the thigh been amputated, he says he could not have worked at his trade. The portions of bone taken away in this case are truly represented of their full size; and the figure of the man as he stands now, eleven months after the operation, is most accurately depicted by the faithful pencil of Mr. Connolly. The bones and original drawings are in my possession."

I have copied from my work on *Operative Surgery* the foregoing description, and also the plates representing the portions of diseased bones taken away, and the picture of the man when he was cured, and the above description as drawn up.

Plate VII. shows the portions of diseased bones separately, and Plate VIII. exhibits them together, as removed in the case of John Gaime, operated on twenty years ago. Plate IX. exhibits a faithful picture, by Connolly, of John Gaime, when the above description was written, nearly twenty years ago.

Twenty years, then, have passed by, and, throughout this long period, the man has laboured at his occupation as a shoemaker without interruption. His appearance and his condition now are as good as they were then. Let the reader refer to the description of his state, so perfect a few months after the operation, and contrast it with his condition now, though nearly twenty years have passed by.

He is now strong and vigorous—sickness has never visited him, and during this long time the limb has never failed him in all the rough usages of life through which he has passed. A few days since (writing now, October, 1872), I had a photograph taken of the man by Mr. Lesage, and conveyed to the stone with the greatest accuracy by the able pencil of Mr. Thomsohn. Plate X. affords an admirable illustration of this remarkable picture. The